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EPIDEMIOLOGY OF PRESSURE ULCERS AMONG THE HIGH-RISK GROUP PATIENTS.

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Background. Pressure ulcer is the damage of skin, mucous membrane and underlying tissue, developed at patients restricted in motion or totally immobile patients. Global burden of pressure ulcers characterized by medical, social and economic aspects of pressure ulcer's prevention and treatment. Injury associates with increasing of mortality rates, high hospitalization incidence and duration, worsening of patient's quality of life.

Propose. To study epidemiological indexes (prevalence and incidence) of pressure ulcers among the patients in high pressure ulcers development risk.

Search strategy. Publication search has done in next databases: Pubmed, ResearchGate, Google Scholar, eLibrary, Cyberleninka. Inclusion criterion: publication date during 2004-2019 years, English, Kazakh, Russian language text, study design– observational, full text papers and conference materials. Exclusion criterion: invitro and invivo studies, case study or series of cases, controlled studies, literature and systematic reviews, another language of publication.

Results. Category of elderly and old patients' prevalence and incidence of pressure ulcers depends on facilities and place of the medical and social aid provision: less rates observed among the elderly care home inhabitants. Epidemiological parameters of this category of patients associated with age of study participants as well. Epidemiological indexes of pressure ulcers among the patients with spinal cord injury not constant too variegated, we haven't found in the publications clear link of injury prevalence with concrete care and treatment conditions. Analysis of epidemiological data among the patients of ICU department revealed the link between the pressure ulcers prevalence and age of patients. Almost in all of the included in to the review publications used the Braden pressure ulcers development risk scale and stage of the injury revealed with tools, recommended NPUAP/EPUAP.

Results. Study the epidemiological indexes among the patients with high risk of pressure ulcers development revealed heterogeneity of studied indexes in included publications, even if the unified tools used for development risk assessment and staging of pressure ulcer prevalence and incidence varies in to the different conditions of medical services provision. Future studies on pressure ulcers prevalence could show the unique epidemiologic situation in region and specific risk factors of the disease.

Key words: *pressure ulcers, epidemiology, prevalence, literature review.*

Резюме

ЭПИДЕМИОЛОГИЯ ПРОЛЕЖНЕЙ СРЕДИ ПАЦИЕНТОВ ГРУПП ВЫСОКОГО РИСКА

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Актуальность. Пролежни — это повреждение кожи, слизистых и подлежащих тканей, возникающее преимущественно у маломобильных или немобильных категорий пациентов. Глобальное бремя пролежней обусловлено медико-социальными и экономическими аспектами профилактики и лечения пролежней. Заболевание ассоциируется повышением показателей смертности, увеличением частоты и длительности госпитализации, значительным ухудшением качества жизни пациентов.

Цель. Изучить эпидемиологические показатели (распространенность и частоту) пролежней среди пациентов с высоким риском развития пролежней.

Стратегия поиска. Поиск публикаций проводился в следующих базах данных: Pubmed, ResearchGate, Google Scholar, eLibrary, Cyberleninka. Критерии включения: даты публикации в период с 2004 по 2019 годы, английский,

русский, казахский языки публикации, дизайн исследований – обсервационные, полнотекстовые статьи и материалы конференций. Критерии исключения: исследования *invitro* и *invivo*, описание случая или серии случаев, контролируемые испытания, литературные и систематические обзоры, иные языки публикации.

Результаты. В группе пациентов пожилого и старческого возраста распространенность и частота развития пролежней зависит от условий и места получения медико-социальной помощи: наименьшие показатели обнаружены среди обитателей домов престарелых. Также эпидемиологические параметры у этой категории пациентов ассоциированы с величиной возраста участников исследования. Эпидемиологические показатели пролежней среди пациентов с повреждением спинного мозга также неоднородны, мы не обнаружили в найденных публикациях четкой связи величины распространенности заболевания с конкретными условиями ухода и лечения. Анализ эпидемиологических данных среди пациентов отделения интенсивной терапии позволил определить наличие связи распространенностью пролежней и возрастом пациентов. Практически во всех, включенных в обзор, публикациях применялась шкала Брайден для оценки риска развития пролежней, а стадия заболевания определялась с помощью инструментов, рекомендованных NPUAP/EPUAP.

Выводы. Изучение эпидемиологических показателей среди пациентов с высоким риском развития пролежней показало неоднородность изучаемых параметров во включенных публикациях, даже при применении унифицированных инструментов оценки риска развития и стадии пролежней распространенность и частота заболевания варьирует в различных условиях получения медицинских услуг. Дальнейшие исследования по распространенности пролежней могут показать уникальную эпидемиологическую ситуацию в привязке к региону и определенным факторам риска развития заболевания.

Ключевые слова: пролежни, эпидемиология, распространенность, литературный обзор.

Түйіндеме

ЖОҒАРЫ ҚАУІП ТОБЫНДАҒЫ ПАЦИЕНТТЕРДІҢ АРАСЫНДАҒЫ ОЙЫЛУЛАР ЭПИДЕМИОЛОГИЯСЫ

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Өзектілігі. Ойылулар — бұл қозғалғыштығы аз немесе жоғалған емделушілерде пайда болатын терінің, шырышты қабаттар мен тері асты тіндердің зақымдануы. Ойылулардың жаһандық ауыртпалығы оларды алдын алу мен емдеудің медико-әлеуметтік және экономикалық аспектеріне байланысты. Индет өлім-жітім көрсеткішінің жоғарылауымен, ауруханаға түсу жиілігі мен ауруханада емделу күндерінің артуымен, емделушілердің өмір сапасының төмендеуімен сипатталады.

Мақсаты. Жоғары қауіп тобындағы пациенттердің арасындағы ойылулардың эпидемиологиялық көрсеткіштерін (таралуы мен жиілігін) зерттеу.

Іздестіру стратегиясы. Басылымдар іздестірілуі келесі деректер базасында жүргізілді: Pubmed, ResearchGate, Google Scholar, eLibrary, Cyberleninka. Қосу критерийлері: басылым мерзімі 2004-2019 жылдар арасы, ағылшын, орыс, қазақ басылым тілдері, зерттеу дизайны – обсервациялық, толық мәтінді мақалалар және конференция материалдары. Шығару критерийлері: *invitro* және *invivo* зерттеулері, оқиғаны сипаттау немесе оқиғалар сериясын сипаттау, бақыланатын зерттеулер, әдеби және жүйелі шолулар, басылымдардың басқа тілдері.

Нәтижелері. Қарт және егде жастағы науқастар тобында ойылулардың таралуы және пайда болу жиілігі медико-әлеуметтік көмек алу шарттары және орнына байланысты: ең төмен көрсеткіш қарттар үйі тұрғындары арасында анықталған. Бұл категориядағы науқастарда эпидемиологиялық көрсеткіштер зерттеу қатысушыларының жасына байланысты болып табылады. Жұлын зақымдалуы бар науқастар тобында ойылулар эпидемиологиялық көрсеткіштері де бір тектес емес, табылған басылымдарда аурудың таралуы мен белгілі бір емдеу және күтім шарттары арасында анық бір қатыныс табылмады. Қарқынды күтім бөлімінің науқастары арасында жүргізілген эпидемиологиялық сараптама ойылулар таралуы мен науқастар жасы арасындағы байланысты анықтауға мүмкіндік берді. Шолуға енген барлық басылымдарда ойылулардың пайда болу қатерін бағалайтын Брайден шкаласы қолданылған және ойылулар деңгейі NPUAP/EPUAP ұсынған құралдар арқылы анықталған.

Қорытынды. Жоғары қауіп тобындағы пациенттердің арасындағы ойылулардың эпидемиологиялық көрсеткіштерін зерттеу қарастырылған басылымдарда зерттеуге алынған көрсеткіштердің бір текті еместігін көрсетіп қана қоймай, ойылулардың деңгейі мен пайда болу қатерін анықтайтын құралдарды пайдаландығына қарамастан медициналық қызмет көрсетудің әртүрлі шарттарында да аурудың таралуы мен жиілігі әр түрлі екендігін көрсетті. Ойылулардың таралуы тақырыбындағы келесі зерттеулер аймаққа байланысты бірегей эпидемиологиялық жағдай мен аурудың айқын пайда болу қатерінің факторларын кайқындай алады.

Түйінді сөздер: ойылулар, эпидемиология, таралушылық, әдебиет шолуы.

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Introduction

Pressure ulcers— localized damage of the skin and / or underlying tissues in areas above the bony prominences occurring due to the pressure or pressure combined with friction [1]. Clinically, pressure ulcers can be represented as visually intact areas of the skin, as well as extremely painful ulcers with damage of muscle and bone. The NPUAP (National Pressure Ulcer Advisory Panel) offers four clinical stages of the pressure ulcer's development depending on the depth of skin and soft tissue damage, and gives definitions to such concepts as unstageable pressure ulcers, deep tissue injuries, pressure ulcers of the mucous membranes [2]. The most common areas for pressure ulcer's development are the sacrum, ischial tubercles, the greater trochanter of the femur, the heels and the lateral surfaces of the ankles [3]. The size of pressure ulcers, their number and localization may vary among a certain category of patients and individual features of patients in the development of the pathological process.

It is considered that the most important risk factors for pressure ulcers are older and elderly age, cognitive impairment, physical trauma, as well as the diseases and pathological conditions that affect the integrity of the skin and it's regeneration (such as urinary incontinence, swelling, impaired microcirculation, protein-deficient conditions, eating disorders) [4]. The combination of different factors can predetermine the development of adverse outcomes. For example, the relative risk of 6-month mortality after a fracture of the femoral neck increases significantly in elderly patients with developed pressure ulcers [5]. Even in correction of demographic and other important variables, presence of pressure ulcers is the factor, worsening patient prognosis for survival [6]. Presence of pressure ulcers associated with reduced patient autonomy, social isolation, and an increased level of anxiety, which further exacerbates the patient's quality of life [7].

In addition to the medical and social aspects of pressure ulcers, an important characteristic of the problem's relevance is the cost-effectiveness of disease management. If cost of the pressure ulcers prevention measures varies in between 2,65 - 87,57 euro per day for one patient in different chains of healthcare system, then for the same patient treatment could cost 1,71- 470, 49 euro per day [8]. This kind of research is aimed health care managers to focus on the prevention of pressure ulcers, which requires an understanding of the epidemiological aspects of the disease. At the same time, professionals dealing with this problem realize that there is no unified picture of the

prevalence of pressure ulcers due to the wide variety of risk factors. The world scientific literature provides a large amount of information about the epidemiology of pressure ulcers, depending on the age, socio-economic and clinical characteristics of the patient.

Therefore, **the aim** of our literature review was to analyze international and national studies on the epidemiology of pressure ulcers and the influence of the main diagnosis, place and treatment conditions on the prevalence of pressure ulcers among the most vulnerable categories of patients with a high risk of developing the disease: older and elderly patients, patients with spinal injury and intensive care unit patients.

Search strategy

In to the literature search included scientific articles, describing epidemiological indexes (prevalence and incidence) of pressure ulcers in various groups of patients, what differ by clinical illness and conditions of medical services provision. Depth of the search is 15 years, search conducted in next data bases: Pubmed, Google Academy, Research Gate. Articles in Russian language are taken from next sources – Cyberleninka and eLibrary. Selected data bases are free access, have a simple search algorithm using keywords and the ability to download the full-text articles.

As the key words used next terms: pressure ulcer, epidemiology, prevalence, incidence, older patients, spinal cord injury, intensive care/critical care. Inclusion criteria: years of publication 2004-2019, publications in English, Kazakh, Russian languages, study design – observational, full text articles and conference materials. Exclusion criteria: in vitro and in vivo studies, case or case series studies, controlled trials, literature and systematic reviews, other languages of publication.

Search conducted by two independent authors. After the article's title and abstract revision non relevant and duplicated records were deleted. Publications selected according to the inclusion criteria; articles assessed on methodology of the conducted study.

Results

On the level of the preliminary search by key words we have found 919 publications, 612 of them were extracted as duplicated records in two or more data bases. As the result of articles screening in accordance to inclusion and exclusion criteria 258 records were extracted. 39 articles evaluated on quality of methodology, 31 of them included to the review. Detailed process of search, appraisal and inclusion of the publications shown on image 1.

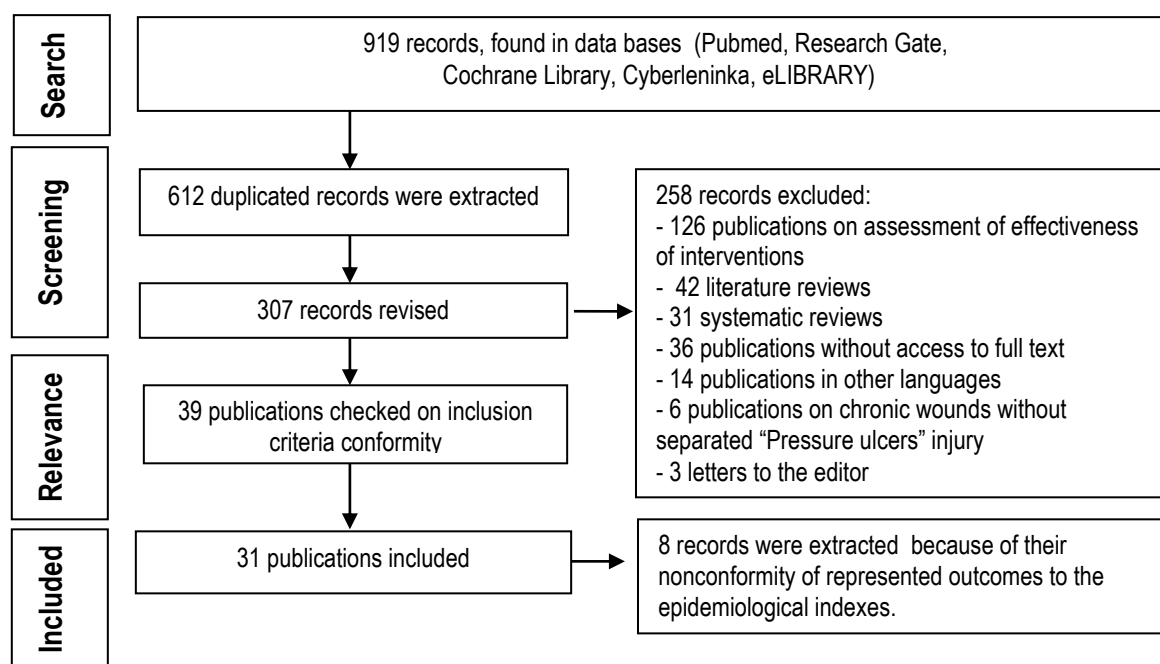


Image 1. Scheme of publications selection and inclusion.

Pressure ulcers among the older and elderly patients

Increase of the quality of life and active longevity among the older and elderly people on the background of health problems associated with aging is an urgent topic of research in modern gerontology around the world. The natural depletion of physiological resources, accumulation of chronic diseases, weakening of financial and social status lead to a deterioration in the general well-being of patients, the extinction of vital functions and the development of immobilization [9].

Conducting research on the epidemiological aspects of pressure ulcers is greatly simplified by the use of national registers, national and local databases. Such kind an approach allows to study the cumulative indexes with covering a large number of patients over a long period of time. Thus, American study, conducted on data base of national register of Agency for Health Research and Quality – National Inpatient Sample in years 2008 -2012, demonstrated the role of patient age in the development of pressure ulcers. The average annual number of patients who had pressure ulcers of at least one localization is 670767 people, it is 1.8% of the total number of cases recorded in the database. At the same time, the average age of patients with pressure ulcers was 71, 2 ± 16, 8 years (68 ± 17.4 years in male, 74, 1 ± 15.5 years in female) [10]. Role of the age as important variable affecting the epidemiological indexes of pressure ulcers, has shown in study of Nakashima S. et al. (2018). As an object of study, the authors choose the provincial Goto archipelago with a population of 37,855 people, 37.7% of them were aged 65 years and older. The studied sample size included 1126 participants; the median age was 85 years. At the time of the study, more than half of the participants were in nursing homes, one third in hospitals, and 13% lived at home. Prevalence of pressure ulcers in studied sample is 10% (n=113). Besides that, authors determined legitimacy in

incidence of pressure ulcers development in different age groups: among people 18 years and older the same index was 9,2 for 1000 population (95% CI 8,1 – 10,2), in sample of participants 65 years and older – 20,3 for 1000 population (95% CI 18,1 – 22,7), and, the last, in age group of participants 80 years and older – 44,6 for 1000 population (95% CI 39,5 – 50,2) [11]. Associations between the age and prevalence of pressure ulcers was highlighted in study by Moore et al. (2011). In study sample, included 1100 patients, prevalence was 9% (n=100), more than half of pressure ulcer cases found in the oldest (80-89 years) age group. Authors noted the statistically relevant link between the pressure ulcers development and age of the patients (p= 0,014 in result of Chi-squared test) [12].

Analysis of included to the review publications shown, that the indicators of pressure ulcers prevalence in older and elder people variegated and depends on conditions of place or setting, where are the patients of particular age group living. Results of cross-sectional study by Rasero et al. (2015) well demonstrated the prevalence scatter of pressure ulcers in elderly (over 70 years) participants in various conditions in Tuscany region of the Italy. Study covered 11957 patients from 47 hospitals (n=3782), 57 nursing care homes (n=1047) и 37 home care services (n=7128). Almost one third of patients, who get home care, had pressure ulcers (31,6%; n = 2252). The lowest rate of the prevalence of pressure ulcers determined among elderly patients, who receive care in nursing homes – 12% (n=126), in hospitals rate were higher – 15,1% (n=571) [13]. Almost all numbers of pressure ulcer's prevalence were received as the result of cross sectional study involving 255 patients of Norway capital hospital. All patients, included in to this study was older than 52 years old and received treatment in hospital for the chief illness, pressure ulcer's prevalence was 14,9% [14]. The large number of the studies demonstrated lower numbers of pressure ulcer's prevalence among the hospitalized older and elder patients.

Thus, prevalence of pressure ulcers among 209 older (65 years and over) patients in one of the therapeutic hospitals of Turkey was 5,8% during the stay in hospital [15]. Retrospective observational study including the data of 3198 patients in age 75 years and over, who stayed in university hospital in Germany allowed to define that the index of pressure ulcer's prevalence is 7,1% [16].

Another group of research study dedicated to reveal the pressure ulcer's prevalence in nursing homes, however the groups of participants are differing. So, in the study conducted by Harms et al. (2014) studied the pressure ulcer's prevalence among the older patients at the moment of the admission to nursing home. Authors analyzed 111640 cases by data of the MDS (Minimal Data Set) register and revealed, that 5% of registered pressure ulcer cases were on 1 stage, a 14% of older patients had 2, 3 or 4 stage of the disease [17]. In multicentered study including data of 2671 patients from 33 nursing homes of Geneva studied pressure ulcer's prevalence among the participants with average 2,1 years length of stay. General prevalence rate was very low – 5,7%, however author noted that the scope of the index was from 0% till 19,6% in some settings [18]. Study of the Russian researchers allowed to determine the prevalence of pressure ulcers among the 85 patients over 65 years old from different settings – boarding house for the elderly, nursing homes, nursing departments. Authors revealed in participants such kind of risk factors of pressure ulcers development as inactivity and urinary incontinence, the average age of the sample was $76 \pm 5,6$ years. In fifty people (58, 8%) pressure ulcers had been diagnosed, the 19 patients (22,4%) noted by presence of pressure ulcers and contact dermatitis. It is necessary to highlight, that in this study pressure ulcers diagnosing was performed by using the Waterloo and Norton scales [19].

Such a scope of the data described in the other studies, where authors aimed to study the prevalence of the pressure ulcers among the elderly patients in outpatient settings. Vieira et al. (2018) while analyzing data of 339 elderly patients, who applied for medical care to one of the Brazilian municipal clinics, found that the prevalence of pressure ulcers among them was 5% [20]. Random sampled cross-sectional study, including 325 Indonesian individuals aged over 60, showed the 1 stage pressure ulcers in 5,2% of participants (95% CI 0,2 – 10,2), in the other hand 10,8% (95% CI 5,8 – 15,8) of participants had pressure ulcers in 2-4 stages [21].

Presented data span in the publications on pressure ulcer's prevalence among the individuals aged 65 years and older could be explained by different reasons: study of index on the basis of register or population, conditions and settings of the medical services provision, belonging to the elderly and old people group. In the other hand, the recent publications presenting trend of decreasing the proportion of the old individuals among the pressure ulcer patients. So, the study of the Finnish authors on topic of pressure ulcer's prevalence in population living on territory of Helsinki decreased from 1,0% to 0,8% during the years 2008-2016. In 8 years, number of old patients, suffering from pressure ulcers, decreased to 35,1% and authors highlighted the effective capacity of the pressure ulcers prevention events taking place in Finland [22].

Pressure ulcers among the patients with spinal cord injury

Spinal cord injury is the serious pathological condition, associated with patient immobilization and disturbance of patient's psycho-emotional status. Pressure ulcers are the most common complication of spinal cord injury, starting with the hospitalization moment until patient's return to the normal environment [23]. Even in the countries with developed healthcare system problem of the pressure ulcers development in patients with spinal cord injury is remaining relevant. According to data of the Swiss prospective cohort study prevalence of the pressure ulcers among the 185 patients in specialized centers was 49,2% [24]. In retrospective study of Krishnan S. et al. (2017) performed analysis of secondary data from Spinal Cord Injury Model Systems (SCIMS) register from 1993 till 2006 ($n = 24762$). Authors compared epidemiological indexes of pressure ulcers among the intensive care unit ($n = 3098$) and inpatient rehabilitation department ($n=1768$), prevalence index was 20,3% and 21,1% respectively. Localization of injured areas was the same in both groups: the most common sites of pressure ulcers development were projections of tail bone, sciatic tubercles, heels and nape [25]. The SCIMS register was used for the prospective cohort study including 104 participants, recruited in first 24-72 hours of intensive therapy unit. Except ICU and inpatient clinic authors have studied prevalence of pressure ulcers in outpatient rehabilitation units. 37,5% ($n = 39$) of participants developed pressure ulcers, the mean of stay period was 35,9 days [26]. Other register, used in USA for statistical count of patients with pressure ulcers in long term care facilities is MDS - Minimal Data Set for long-term care facilities. According to the data of the MDS-register including 51664 patients, receiving medical services in nursing homes and other long-term care facilities, prevalence was 10% [27].

Comparison of similar study results conducted in USA and in developing countries, showed a clear and logic picture, what we tried to describe further. Joseph C. et al. (2015) studied the prevalence of complications among the 141 patients with spinal cord injury in South Africa. In this study the leading position took the pressure ulcers ($n = 42$; 29,8%), what much more than the pathology of the respiratory system ($n = 33$; 23,4%) and excretory system infections ($n = 24$; 17%) [28]. Also, epidemiological situation may be unclear with in the country and pressure ulcers prevalence may be determined in different ranges at the identical patient's treatment and care conditions. Two Brazilian studies, had the aim to study prevalence of pressure ulcers among the patients, hospitalized in emergency units. In retrospective study by Nogueira et al. (2006) prevalence of pressure ulcers among the 47 patients was 42,5%, and in prospective study by Santos et al. (2012) including 217 patients the same index was 3,7% [29,30]. In the other hand, epidemiological rates could vary depend on place and the stage of provided medical services. Retrospective study covered 631 Chinese patients with spinal cord injury showed development of at least one pressure ulcer in 2,7% of cases [31]. Cross sectional study, conducted with participation of 26 Chinese patients, victims of earthquake in Sichuan at 2008, showed that almost half of the study participants (46,2%) have

developed the pressure ulcers within a year after the discharge from hospital [32].

Some studies devoted to the pressure ulcers development in patients using the wheelchairs. So, in cross-sectional study by Kovindha A. et al. (2015) participated 129 patients with chronic spinal cord injury. Thirty-four patients (26,4%) at the examination moment had pressure ulcers at least on one site, 36 patients (27,9%) had pressure ulcers according to their previous medical history, and almost half (n=59; 45,7%) didn't have pressure ulcers. [33]. This result corresponds with the conclusion of another cross-sectional study, conducted in university hospital in Norway. Authors identify pressure ulcers in more than half of cases (n=39; 52%) in sample consisting of 75 wheelchair users [34].

So the analysis of publications on pressure ulcers prevalence among the patients with spinal cord injury showed very wide scope of epidemiological indexes in different regions and conditions of medical services provision.

Pressure ulcers in patients of intensive care unit

Patients, admitted to the intensive care unit (ICU), are in high risk group of pressure ulcer's development because of the next causes: they can't adequately feel the increasing of the pressure or friction due to the consciousness disturbances and impact of treatment by analgesics and myorelaxants play role as well. The risk of pressure ulcer's development increasing due to the presence of secondary disease and disturbances of hemodynamics [35].

Results of some studies demonstrating the variety of epidemiological data depend on the cause of admission to the ICU. Prospective cohort study by Kaitani et al. (2010) has given results of 98 patient's data, who admitted to the ICU of Tokyo hospital during 3 months. Prevalence of pressure ulcers in studied sample was 11,2% (n=11). Further analysis showed that the cause of admission to the ICU is statistically significant variable, influencing to the pressure ulcers development. So, the highest rate of pressure ulcer's prevalence revealed in ICU patients (54,6%; n=6), the next was the patients, transferred from other departments (27,3; n=3). The lowest rate of prevalence observed in patients after planned surgery (18,2%; n=2) ($p = 0,002$ using Fisher's exact criterion) [36]. Other prospective cohort study, conducted in 9 ICUs of 5 hospitals in Grenada province of Spain, also showed the impact of hospitalization cause to the pressure ulcer's development. Study included 299 patients, connected with artificial ventilation machine. In forty-seven (16%) patients developed pressure ulcers at stage higher than 1. One of the variables influencing to the pressure ulcers development was the hospitalization due to the surgical diagnosis (22 participants with pressure ulcers out of 99 patients with surgical diagnosis against 12 participants with pressure ulcers out of 200 patients with therapeutic diagnosis; $p = 0,03$ using Fisher's exact criterion) [37]. In retrospective cohort study by O'Brien et al. (2014) prevalence of pressure ulcers was 10,7% in sample of 2695 participants, who were under the post-surgical emergency care, statistically significant risk factor was intra-surgical blood and blood components transfusion [38].

Other bunch of studies devoted to study the pressure ulcer's prevalence among the ICU patients receiving the sedative medicines. Cox et al. (2011) in their retrospective described study revealed the link between infusions of norepinephrine during the surgery and further pressure ulcers development in 347 ICU patients. Prevalence of pressure ulcers in studied sample was 18,7% (n=65), the statistically significant factors included norepinephrine administration. ($\beta = 0,017$; $p = 0,04$; $OR = 1,017$; 95% CI 1,001-1,033) [39]. Llauro-Serra et al. (2016) determines the pressure ulcers prevalence as 9,1% (34 patients out of 276 admitted to ICU in Spain). In addition to other risk factors, sedation was statistically significant in development of pressure ulcers: 72,8% (40,6-95,4) in patients without pressure ulcers versus 100,0% (86,7 - 100,0) in patients with pressure ulcers ($p < 0,001$ using chi-square test) [40].

A review of publications on the prevalence of pressure ulcers among ICU patients demonstrates some differences in the desired index depending on certain risk factors, thus emphasizing the need to include as many indexes as possible in the registers of patients with pressure ulcers for a full analysis of the epidemiological situation and associated conditions.

Conclusion

An analysis of the included publications showed that the prevalence of pressure ulcers in vulnerable categories of the population remains quite high. Obviously, the main links in the pathogenesis of pressure ulcers - compression of the skin, underlying fatty and muscle layers, impaired microcirculation, trophism and tissue sensitivity, which influencing high epidemiological indexes in people with limited mobility. A fairly large number of studies are devoted to the diagnosis, assessment of risk factors, interventions for the prevention and treatment of pressure ulcers among the orderly and elderly groups, patients with spinal cord injuries and people receiving medical care in intensive care units. Our search strategy allowed us to identify 31 full-text publications for inclusion in the review, where only one was in Russian.

We found a fairly wide range of indicators of the prevalence of pressure ulcers among people whose age was 65 years and older. The epidemiological indexes in this high-risk group turned out to be the most susceptible to numerous factors: the main disease, the conditions for receiving medical and social assistance, and age. The highest prevalence and incidence of pressure ulcers were found in groups of people with spinal cord injury, what is logical due to complete immobility and the presence of concomitant disturbances in vital functions and a deterioration in voluntary regulation of urination and defecation. Relatively low prevalence figures were found in patients in intensive care units, however, the influence of many risk factors is not excluded in this group. The risk assessment tools (Braden scale) and stage diagnosis tools (NPUAP classification) of pressure ulcers is used in almost all articles, because the use of standardized methods is necessary to recognize the results of the study at the level of the international scientific community.

The heterogeneity of the analyzed sources dictates certain tasks for researchers. Firstly, further study of the prevalence of pressure ulcers at the level of individual

countries and regions is necessary to obtain a more holistic view of the global problem of the epidemiology of the disease. The shortage of methodologically high-quality publications on the prevalence of pressure sores in Russian demonstrates the need for epidemiological studies in the Commonwealth of Independent States countries, in particular in Kazakhstan. Secondly, numerous factors affecting the epidemiology of pressure sores must be taken into account. Third, identifying and monitoring the epidemiology of pressure sores can be a useful tool for evaluating disease prevention measures, including the effectiveness and safety of nursing interventions.

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Authors input:

Zhetmekova Zh. – literature search, writing a review, correspondence with the editorial office

Kassym L. – developing ideas and concepts, methodologically assessing the quality of the articles included, writing a review

Akhmetova A. – writing a review, counseling

Altaibayeva Ye. - literature search.

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